

REMARKS

Reconsideration and withdrawal of the rejections set forth in the Office Action dated April 13, 2005 are respectfully requested.

This communication is in response to the first Office Action dated April 13, 2005. In the Office Action, Claims 1,3,6,8,9,12,14,18 and 19 are rejected under 35 USC 102 (b) as being anticipated by **Moore** et al. (U.S. Patent No. 5,120,678) . In the Office Action, Claims 5,6,10,16 and 20 are rejected under 35 USC 103 (a) as being unpatentable over **Moore** et al. (U.S. Patent No. 5,120,678) . In the Office Action, Claims 1, 2, 4-13 and 15-21 are rejected under 35 USC 103 (a) as being unpatentable over **Fukihuru** (US Patent No. 6,150,748) .

Applicant has amended the rejected and objected matter noted by the Examiner. In view of the amendments above and the remarks set forth, Applicant respectfully requests reconsideration.

Rejections under 35 U.S.C. § 102 (b)

1. Rejection of Claims 1,3,6,8,9,12,14,18 and 19 under 35 USC 102 (b) as being anticipated by **Moore**.

Moore discloses an electrical component package comprising polymer-reinforced solder bump interconnection. *In col. 4, lines 4-10 of Moore*, an electrical component package indicated generally at 10 in FIG. 3, comprises an integrated circuit component 12 mounted onto a printed circuit board substrate (PCB) 14 by a polymer-reinforced solder bump interconnection 16. *In col. 5, lines 11-14 of Moore*, a second bead 46 of a viscous thermally curable epoxy-base precursor material is applied onto region 20 intermediate dam 44 and component 12. *In col. 5, lines 21-25 of Moore*, during heating, the viscosity of the precursor material is reduced to create a free-flowing liquid that spreads over region 20 about component 12, forming a pool contained by dam 44, and is drawn into the gap 43

by capillary action. Actually, the bead 46 of **Moore** is an intermediary of forming a pool contained of the solid film 50 shown as Fig.3 by capillary action during curing heating process. Therefore, the solid film 50 bonds to the interface 32 and board region 20 to reinforce the attachment of component 12 to PCB 14 as the polymer-reinforced solder bump interconnection 16. In other words, the bead 46 cannot function as a buffer layer, and the bead 46 is cured to produce a solid film 50 by capillary action through the gas passage 24 during the curing heating process. The solid film 50 functions as a polymer-reinforced solder bump interconnection 16 to reinforce the solder bump 42. In other words, the solid film 50 is not to be used as a buffer layer between the printed circuit board substrate (PCB) 14 and integrated circuit component 12. Accordingly, the citation of **Moore** does not disclose or teach a buffer layer formed between the substrate and the electronic device, and the buffer layer having an opening to expose the first plurality of contact pads of the claimed invention.

In col. 4, lines 22-29 of Moore, the integrated circuit component 12 comprises a semiconductor chip 26 mounted onto an alumina carrier 28 and protected by cover 30. Carrier 28 includes an interface 32 opposite semiconductor chip 26 and facing PCB 14. Carrier 28 further comprises a series of metallic through-hole conductors 34. Each conductor 34 is connected to semiconductor chip 26 by a wire lead 38 and includes an electrical contact 40 at carrier interface 32. As above mentioned, the chip 26 is connected the solder bump 42 through the wire lead 38, the conductor 34 and the electrical contact 40. In other words, the electrodes of the chip 26 of **Moore** do not directly connect to the solder bump 42 connected the electrodes of the PCB 14, therefore the electrodes of the chip 26 of **Moore** should not be opposite to the surface of the substrate. Accordingly, the citation of **Moore** does not disclose or teach the electronic device having electrodes being opposite to the first surface of the substrate of the claimed invention.

Furthermore, *in the Moore*, there is no evidence showing “wherein the buffer layer has a first part with a first density and a second part with a second density, the first density greater than the second density,” wherein the second part of the buffer

layer surrounds the edge of the electronic device and the first part of the buffer layer is configured with the electronic device such that the buffer layer functions as a self-planarization buffer between the electronic device and the substrate for increasing the hermeticity thereof". We emphasize that **Moore** does not disclose or teach a buffer layer, and the purpose of **Moore** is utilized the precursor liquid injected into the gap through a passage in the substrate and cured to form a film that reinforces and protectively encapsulates the solder interconnections. The purpose of the application is utilized the buffer layer configured with the substrate and the electronic device to increase the hermeticity thereof. Therefore, **Moore** fails to disclose or teach the technical features of the claim 1 and 12 of the claimed invention. Claims 3,6,8 and 9 are dependent claims of the claim 1. Claims 14,18 and 19 are dependent claims of the claim 12. Claims 1,3,6,8,9,12,14,18 and 19 of the claimed invention meets the requirement of novelty.

2. Rejection of Claims 1, 2, 4-13 and 15-21 under 35 USC 103 (a) as being unpatentable over **Fukihuru**.

In the Office Action, Examiner argues that **Fukihuru** shows a buffer layer (portion of 21-2, 32 between 1 and 36 and the portion along the side of 1) between said substrate and said electronic device. After carefully review of the citation, applicant does not agree with the Examiner. Actually, there is no buffer layer in the citation of **Fukihuru**.

From the disclosed specification of **Fukihuru**, he fails to disclose the concept and element of the buffer layer 30 of the present invention. As a matter of fact, the element 32 of **Fukihuru** is a conductive film 32, therefore it is not used as the buffer. Moreover, Al thin-films 31 of **Fukihuru** are separate from the SAW element 1, therefore the conductive film 32 surrounding edges need to be conductive. There is no actual corresponding element of citation to the elements of the claimed invention's element 30 that acts as buffer.

However, the conductive film 32 of **Fukihuru** has a thermocrimping property (property of connecting a material with other material under heat and pressure) (*in col. 4*,

lines 9-11) . But, the first part of the buffer layer 30 of the present invention creates the contact airtightly edge by configured with the electronic device 10 during the bump bonding 16 process without thermocrimping. In other words, the buffer later 30 of application functions as a gasket directly, and the above configuration produces a physically squeeze tight. Therefore, the citation of **Fukihuru** teaches away the present invention. Moreover, the conductive film 32 of **Fukihuru** needs an additional resin member 34 to make a chamber airtight from ambience. The claimed invention may achieve the airtight purpose without the additional member 34.

Furthermore, the conductive film 32 of **Fukihuru** needs to surround the SAW element 1 horizontally and vertically across the edge and boundary of the SAW element 1. And, the conductivity of the present invention is achieved by metalization while the conductivity of **Fukihuru** uses Al thin-films 31 and the conductive film 32 to achieve the purpose.

Accordingly, thermocrimping and conductive property of the conductive film 32 of **Fukihuru** results in several drawbacks as follows: 1) limited material type and more cost; 2) more complicated process; 3) needs additional resin member 34 to make the chamber airtight. In contrast, the present invention only needs a buffer layer 30 to create the contact airtight edge by configuring with the electronic device 10 during the bump bonding 16 process without thermocrimping.

The Examiner argues that the specification does not disclose the critical nature of the claimed dimension, i.e. buffer layer 30 with a thickness of 30-200 microns (claim 8) , or any unexpected result arising therefrom, and Applicant must show that the chosen dimensions are critical (*In re Woodruff*) . In general, the thickness of solder ball is 30~100um. The solder ball bonding process could reduce the height of solder ball, for example 20~90um after bonding. Besides, the compression deformation for the organic buffer layer can be reach range from a few percent upto 300% . Therefore, the thickness of

the buffer layer is preferably 30~200um to meet the requirement of compression deformation. For example, thickness of the solder ball is 50~60um, and thickness of the buffer layer is 75um. The thickness of the solder ball may reach 30um after bonding.

Furthermore, *in the Fukihuru*, there is no evidence showing “wherein the buffer layer has a first part with a first density and a second part with a second density, the first density greater than the second density, wherein the second part of the buffer layer surrounds the edge of the plurality of electronic devices and the first part of the buffer layer is configured with the electronic device such that the buffer layer functions as a self-planarization buffer between the electronic device and the substrate for increasing the hermeticity thereof”. We emphasize that **Fukihuru** does not disclose or teach a buffer layer similar with the present. The purpose of the application is utilized the buffer layer configured with the substrate and the electronic device to increase the hermeticity thereof. Therefore, according to above-mentioned, **Fukihuru** fails to reach the structure, performance and technical features of the claimed invention. More important, there is no any motivation indicated that **Fukihuru** suggests the claimed invention. Claims 2, 4-11 are dependent claims of the claim 1. Claims 13, 15-21 are dependent claims of the claim 12. Accordingly, Claims 1, 2, 4-13 and 15-21 of the claimed invention overcome the obviousness rejection.

In view of the foregoing remarks, Applicant respectfully request that the Examiner withdraw his rejections and the case be passed to issuance.

Applicant respectfully traverses the Examiner's rejection of Claims 1 to 21 under 35 USC 102 (b) , 35 USC 103 (a). The novelty and obviousness rejection is overcome.

Conclusion

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In view of the foregoing, the claims pending in the application comply with the requirements of 35 U.S.C. 102 (b) , 103 (a) and patentably define over the applied art.

A Notice of Allowance is, therefore, respectfully requested.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 50-0665, under Order No. 386998035US from which the undersigned is authorized to draw.

Dated:

7/13/05

Respectfully submitted,

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